

Solar System and Universe (Earth and Space Science Unifying Concept B)

The universe is a dynamic system of matter and energy. The universe is extremely large and massive with its components separated by vast distances. Tools of technology will continue to aid in the investigation of the components, origins, processes and age of the universe. Earth is one part in our solar system, which is within the Milky Way galaxy. The Sun is the energy-producing star for our solar system. Most objects in our solar system are in predictable motion, resulting in phenomena such as day/night, year, phases of the moon, tides, and eclipses.

By the end of the grade band:		By the end of the grade band, students know and are able to do everything required in earlier grades and:		By the end of grade band, students know and are able to do everything required in earlier grades and:		By the end of grade band, students know and are able to do everything required in earlier grades and:		
Grades K - 2		Grades 3 - 5		Grades 6 - 8		Grades 9 - 12		
E.2.B	Students understand there are objects in the sky, which display patterns.	E.5.B	Students understand that there are many components in the solar system including Earth.	E.8.B	Students understand characteristics of our solar system that is part of the Milky Way galaxy.	E.12.B	Students know scientific theories of origins and evolution of the universe.	
E.2.B.1	Students know objects in the sky display patterns in how they look, where they are located, and how they move. I/S	E.5.B.1	Students know there are more stars than anyone can easily count, but they are not scattered evenly, and they are not all the same in brightness or color. W/L	E.8.B.1	Students know the universe contains many billions of galaxies, and each galaxy contains many billions of stars. W/L	E.12.B.1	Students know common characteristics of stars. I/S	Components of the Universe
				E.8.B.2	Students know the solar system includes a great variety of planetary moons, asteroids, and comets. I/S	E.12.B.2	Students know stars are powered by nuclear fusion of lighter elements into heavier elements, which results in the release of large amounts of energy. I/S	
		E.5.B.2	Students know the solar system includes the Sun, planets, and moons. E/S	E.8.B.3	Students know characteristics of the planets in our solar system. I/S	E.12.B.3	Students know ways in which technology has increased understanding of the universe. I/S	
				E.8.B.4	Students know Earth is part of a solar system located within the Milky Way Galaxy. E/S			
		E.5.B.3	Students know stars are like the Sun, but they are so far away that they look like points of light. W/L	E.8.B.5	Students know the Sun is many thousands of times closer to Earth than any other star, and billions of times closer than the far end of the Milky Way Galaxy. W/L	E.12.B.4	Students know the on-going processes involved in star formation and destruction. W/L	Formation of Universe
				E.8.B.6	Students know the Sun is a medium-sized star located in the Milky Way Galaxy, part of which can be seen as a glowing band of light spanning the clear night sky. W/L	E.12.B.5	Students know scientific evidence suggest that the universe is expanding. I/S	
E.2.B.2	Students know the Sun rises every day, and the Moon can rise during the day and/or the night. E/S	E.5.B.4	Students know there are cyclical patterns of observable objects in the solar system. I/S	E.8.B.7	Students know regular and predictable motions of Earth around the Sun and the Moon around the Earth explain such phenomena as the day, the year, phases of the Moon, and eclipses. E/S	E.8.B.7: Students know regular and predictable motions of Earth around the Sun and the Moon around the Earth explain such phenomena as the day, the year, phases of the Moon, and eclipses. E/S	Celestial Motion	
E.2.B.3	Students know the Sun and Moon appear to move across the sky. I/L	E.5.B.5	Students know the patterns of stars in the sky stay the same (e.g., the constellations), although they appear to move across the sky nightly, and different stars can be seen in different seasons. (14.5.2) W/S					
E.2.B.4	Students know the Moon appears to change shape over the course of a month. I/L							